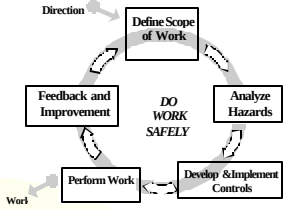
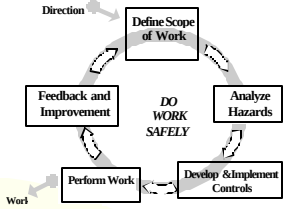


Chemical Safety Management at the Work Activity Level; Perspectives from the DOE Office of Independent Oversight and Performance Assurance

Marvin Mielke, RN, MSN
Jim Lockridge PE, CIH, CSP



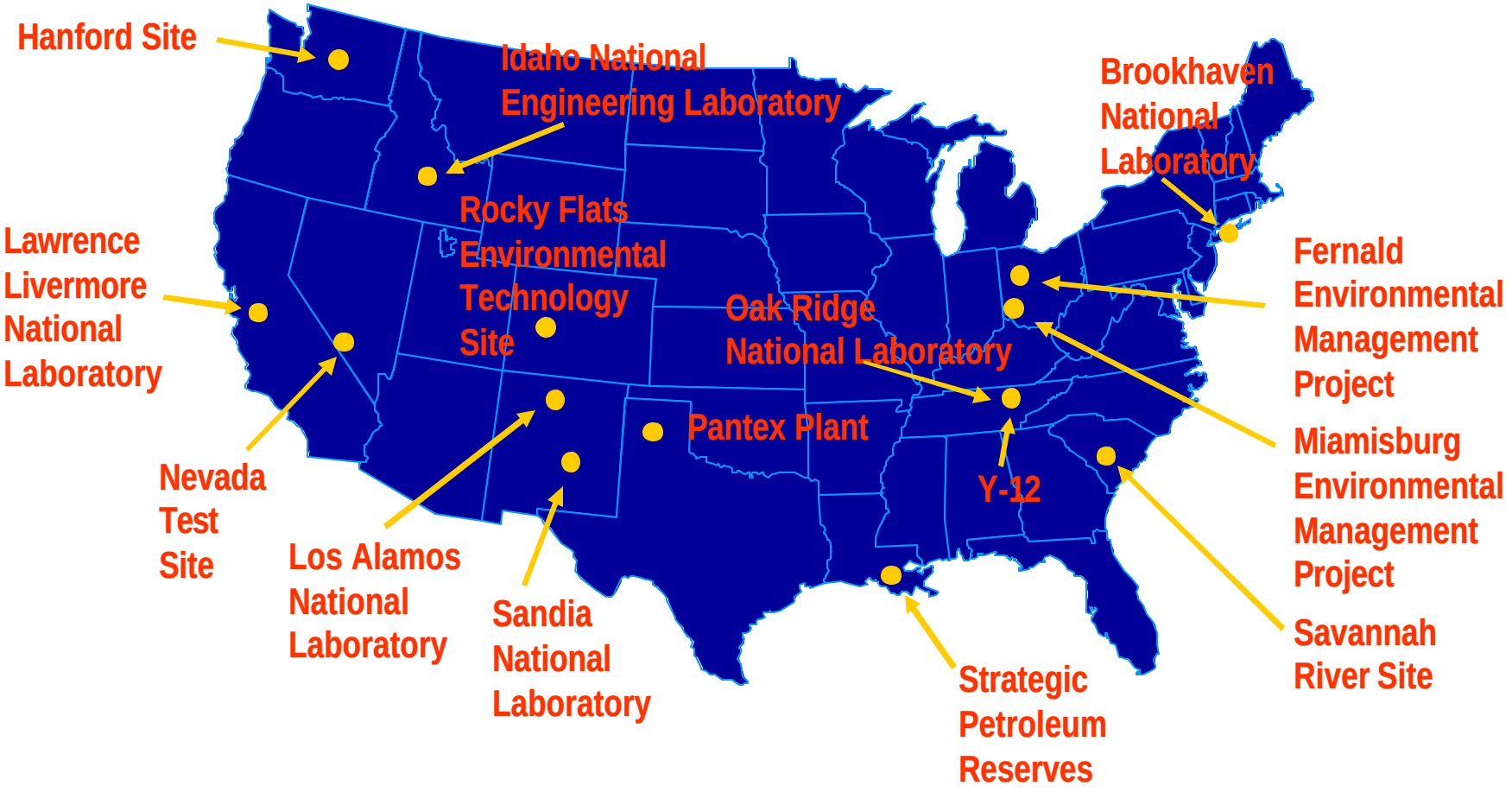
Overview

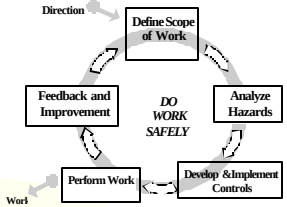
- Since October 2001, Department of Energy, Office of Oversight, Office of Environment, Safety and Health (OA-50) has conducted independent ES&H inspections at 21 DOE sites.

- One or more aspects of chemical management and chemical usage at the activity level has been evaluated at each of these sites.

- DOE sites evaluated for chemical management represent a cross-section of work performed in DOE Complex.
  - ✓ Research and development
  - ✓ Operations
  - ✓ Construction and maintenance
  - ✓ Subcontractors
  - ✓ Waste Management and D&D activities.

Typical Locations for OA-50 ES&H Evaluations

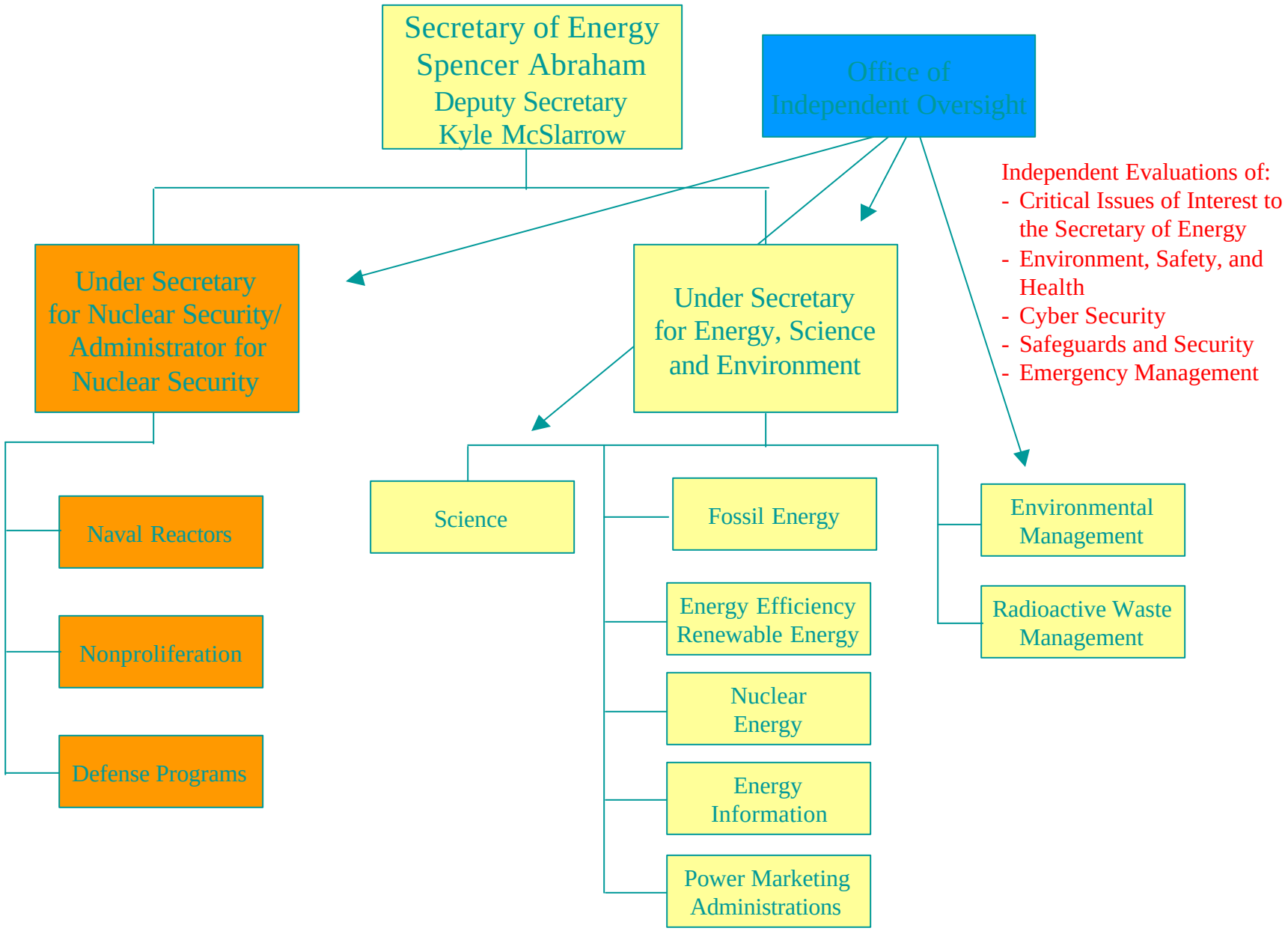


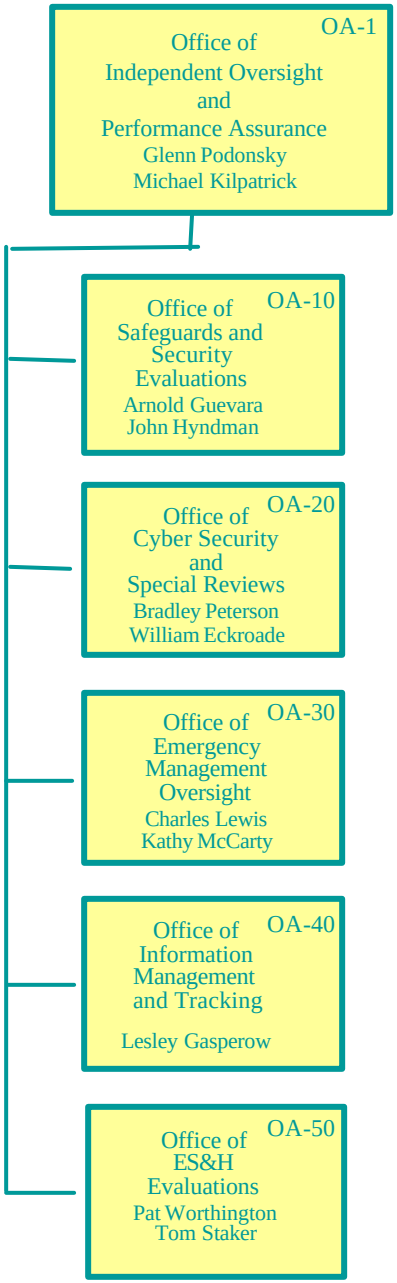


Focus of OA-50 Evaluations

- Evaluate ES&H performance including the adequacy of Integrated Safety Management Systems and implementation of these systems through review of a sample of work activities, and functionality of select engineered systems to protect the workers, public, and/or environment.

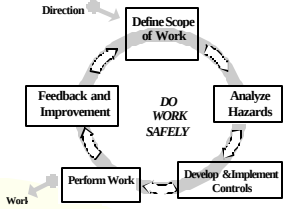
Office of Independent Oversight



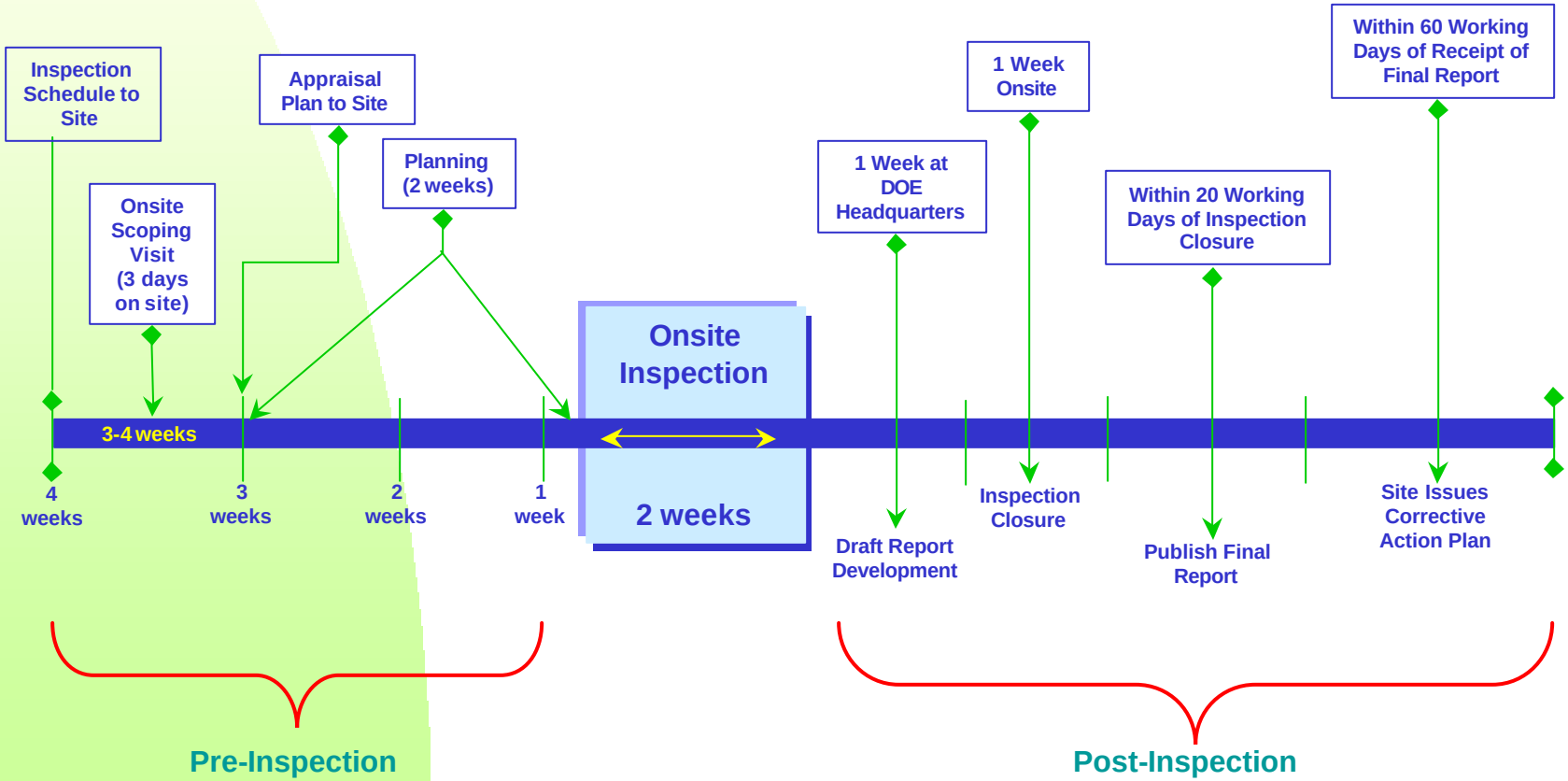


Independent Oversight Offices

- Office of Safeguards and Security Evaluations
  - Evaluates the Effectiveness of Safeguards and Security Policies and Programs through On-Site Inspections
- Office of Cyber Security and Special Reviews
  - Conducts Evaluations of the Effectiveness of Classified and Unclassified Computer Security Policies and Programs and Maintains Continuous Program for Assessing Internet Security, to Include Off-Site Scanning
- Office of Emergency Management Oversight
  - Conducts Regular Assessments of Emergency Management Policies and Programs and Evaluates Effectiveness of Program Office Monitoring of Emergency Management Preparedness and Performance
- Office of Information Management and Tracking
  - Tracks Issues and Findings Resulting from OA Assessments, Maintains an Electronic Document Storage and Retrieval System, and Operates an Information Management Control Center
- Office of ES&H Evaluations
  - Evaluates the Effectiveness and Implementation of Departmental ES&H Policies, Requirements, and Programs
  - Evaluates the Effectiveness of the Implementation of Integrated Safety Management Systems through On-Site Evaluations


Direction
Define Scope of Work
Analyze Hazards
Develop &Implement Controls
Perform Work
Feedback and Improvement
DO WORK SAFELY

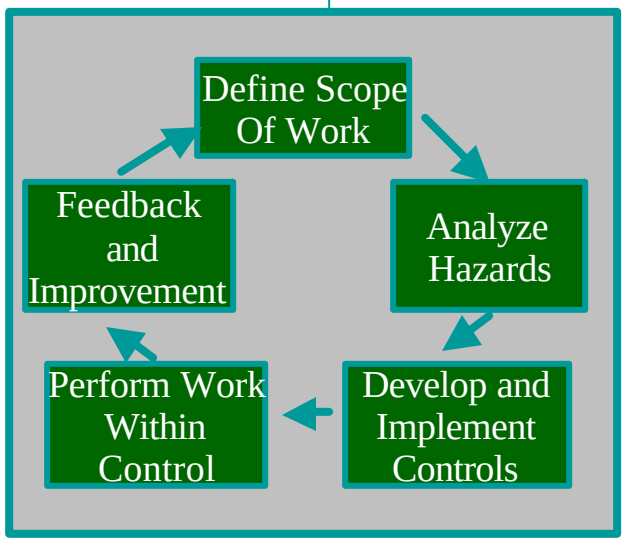
Sequencing


Inspection Schedule to Site
Onsite Scoping Visit (3 days on site)
Appraisal Plan to Site
Planning (2 weeks)
Onsite Inspection
2 weeks
1 Week at DOE Headquarters
1 Week Onsite
Within 20 Working Days of Inspection Closure
Within 60 Working Days of Receipt of Final Report
3-4 weeks
4 weeks
3 weeks
2 weeks
1 week
Draft Report Development
Inspection Closure
Publish Final Report
Site Issues Corrective Action Plan
Pre-Inspection
Post-Inspection

ES&H Approach

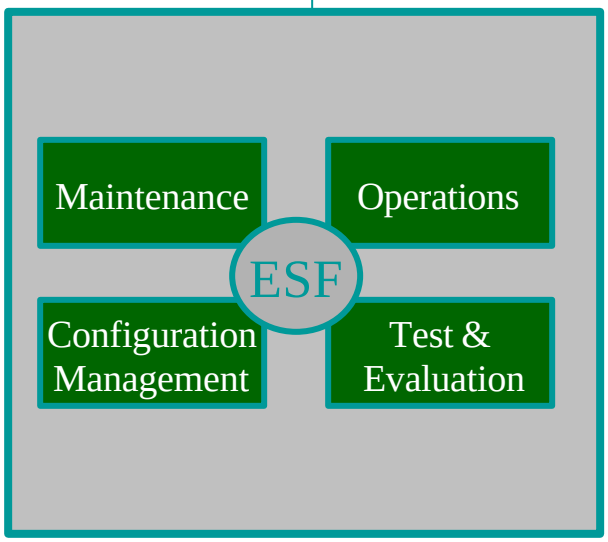
Guiding Principles

Analysis of Information and Findings

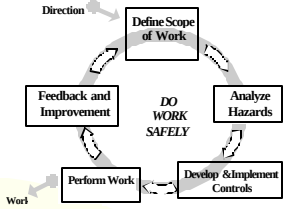


Facility/Program/Work Activity

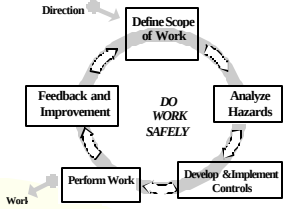
- Facility safety
- Nuclear safety
- Environmental Protection
- Health
- Worker Safety



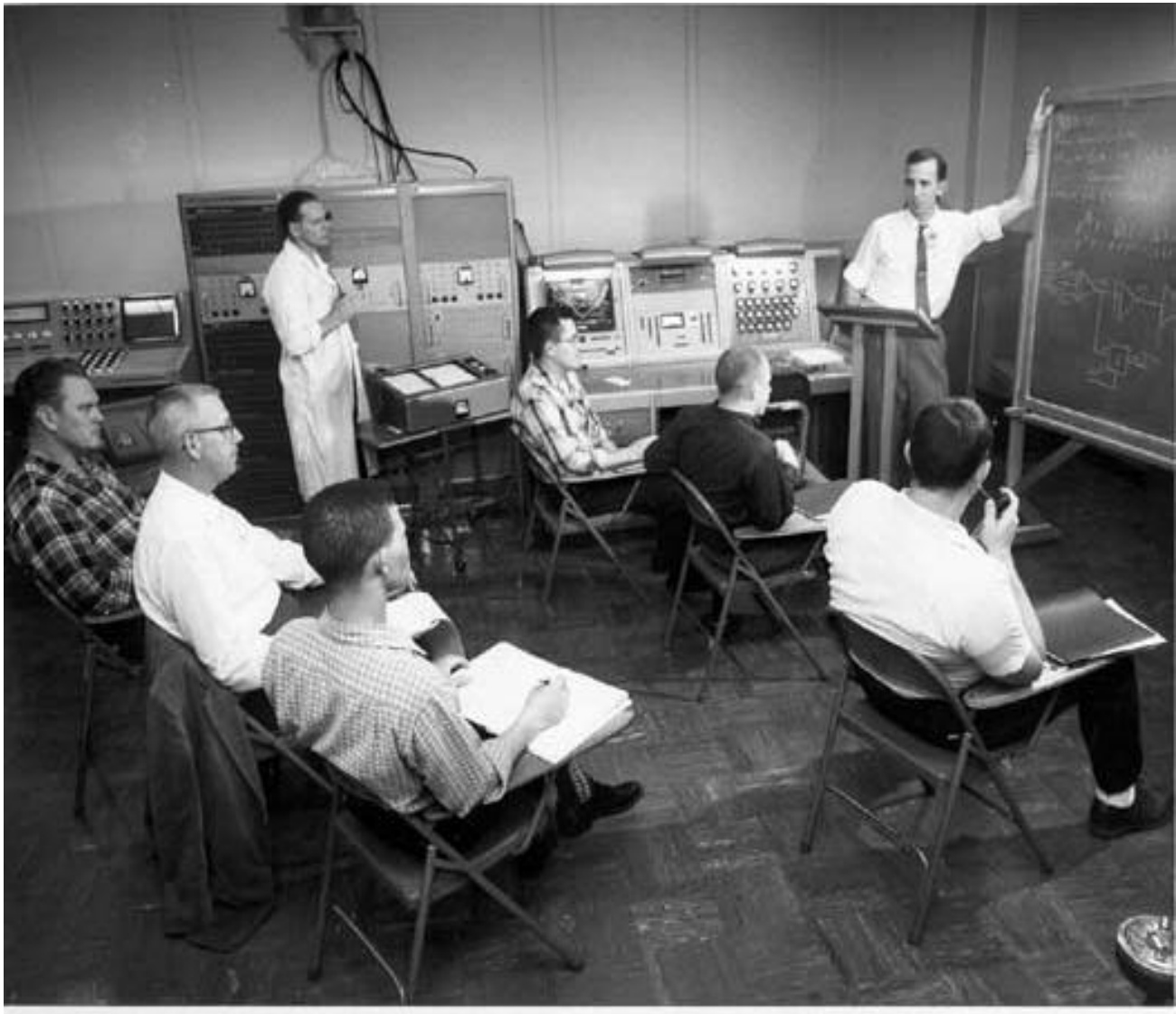
Essential Systems Functionality

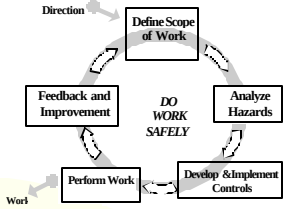


Core Functions



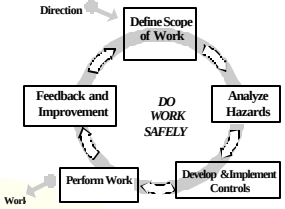
Define the Work





Define the Work

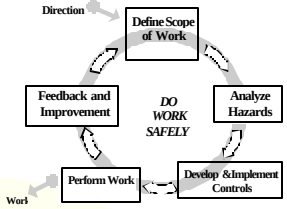
"Missions are translated into work, expectations are set, tasks are identified and prioritized, and resources are allocated."



Define the Work

Strengths ……

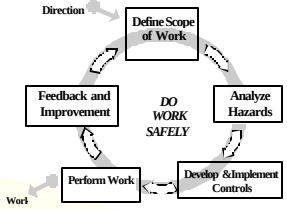
- Facility and activity level work scopes in work packages, project plans, and research proposals are generally adequate such that potential chemical use can be identified.
- Safety basis documents (e.g. Safety Analysis Reports, Facility Hazard Assessments, etc.) typically address the presence and use of hazardous chemicals.
- The integration of ES&H, workers, line management and facility management in planning work has enhanced the ability to identify and plan for chemical use.



Define the Work

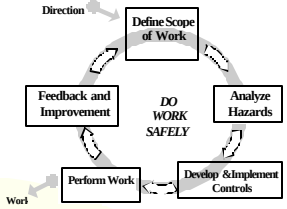
Opportunities for Improvement ...

- Providing more guidance on chemical use during work planning would improve the allocation of appropriate resources, and level of risk characterization and work planning.
- Some work definitions are too broad and cover too extensive a work scope, such that chemical usage is not clearly defined.
- Subcontractor specifications have not been sufficiently clear with respect to the control of hazardous chemicals in the workplace. Some second and third sub-tier contractors were unaware of site restrictions on procuring and use of chemicals, training requirements, etc.

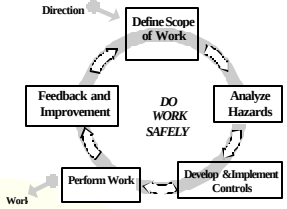


Opportunities for Improvement (continued) ...

- In some cases, the work definition fails to include ancillary work (e.g. setup and dismantlement of research experiments) resulting in chemical hazards being missed for those aspects of the work.

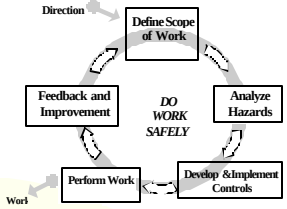


Analyze the Hazards



Analyze the Hazards

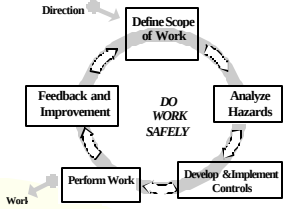
"Hazards associated with work are identified, analyzed and categorized"



Analyze the Hazards

Strengths ….

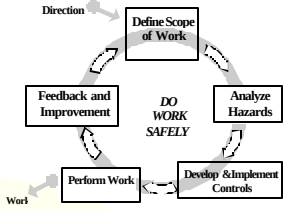
- Chemical hazards are analyzed at facility, project, and work activity levels.
- Hazard identification and analysis processes (e.g. JHAs) have integrated chemical use practices.
- Computer-based hazard analyses systems, and other hazards analysis tools, have facilitated chemical identification and incorporation of the appropriate requirements and permits.
- The facility manager concept has enabled a more consistent and integrated approach to chemical management, and greater assurance in maintaining the facility safety envelope.



Analyze the Hazards

Opportunities for Improvement …

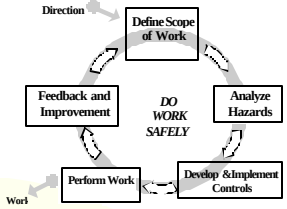
- Legacy chemical hazards were not sufficiently identified and characterized at some sites (chemical waste, beryllium).
- Baseline hazards assessments as described in DOE 440.1A and the DOE Industrial Hygiene Technical Standard are not being maintained for chemical use at a number of sites.
- Exposure assessments and chemical sampling is not being performed at a frequency as recommended by DOE 440.1A.
- Occupational medical requirements of 440.1A with respect to chemicals have not been implemented at some sites (e.g. routine involvement of the medical staff in hazard identification, medical surveillance programs).



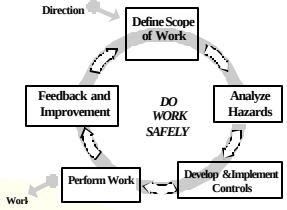
Analyze the Hazards

Opportunities for Improvement (continued) …

- At a number of sites medical personnel have not been adequately integrated in chemical hazard identification teams.
- Subcontractors, on a number of occasions, have introduced and used chemicals in the work place which were not reviewed or approved by ES&H.
- Some buildings and systems awaiting D&D have not been sufficiently characterized to identify the appropriate controls.

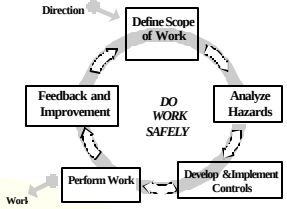


Define & Implement Controls



Define & Implement Controls

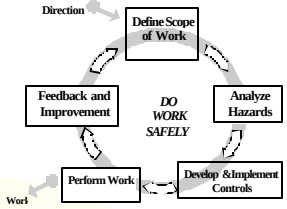
" Safety standards and requirements are identified and agreed upon, controls to prevent/mitigate hazards are identified, the safety envelope is established, and controls are implemented."



Define & Implement Controls

Strengths …

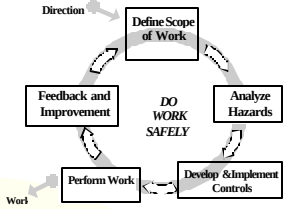
- Most sites have been aggressive in minimizing the quantities of chemicals stored onsite (e.g., chlorine for water treatment). A number of sites are no longer under OSHA Process Safety Management requirements as a result.
- Many sites have developed and implemented automated chemical inventory and tracking systems.
- Most sites maintain, or attempt to maintain, an accurate inventory of chemicals.
- Several sites have developed programs for internal exchange of chemicals among departments.
- Most sites have provided effective mechanisms to ensure workers can readily access MSDSs.
- Engineering controls at most sites are effective in controlling exposures to chemical hazards. Some controls are very effective (e.g. computer controlled fume hoods, door interlocks linked to training, etc.)



Define & Implement Controls

Opportunities for Improvement …

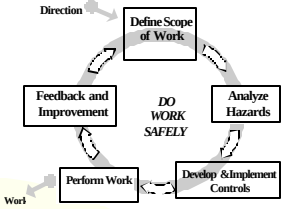
- Some chemicals have no clear disposition; particularly those chemicals that are neither in current use, nor have been designated as waste.
- A number of laboratories tend to accumulate hazardous chemicals either in fume hoods, or containers for some undefined “future use”.
- Some contractors, and particularly subcontractors, have failed to implement ACGIH TLVs as required by their site contract.
- The requirements for use and control of chemicals by subcontractors (DOE Orders, ACGIH Standards) is not included in subcontractor specifications, or differs from the requirements for the site contractor. This has resulted in different requirements for handling or use of chemicals at the same site.



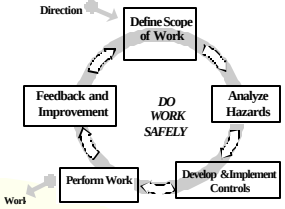
Define & Implement Controls

Opportunities for Improvement (continued) ...

- Medical surveillance programs for some chemicals have not been adequately in identified in procedures and/or implemented.
- Historical records of chemical exposures are not maintained and/or easily accessible to facilitate the reconstruction of a workers exposure history to chemicals used in the workplace.
- Training requirements for chemicals are not adequately identified in work documents (e.g. site specific hazard communication).
- Work place postings, in some cases, do not adequately communicate the the chemical hazard. (For example, “chemical carcinogens may be present”)
- PPE selection requirements for chemical gloves are not correlated to the chemical hazard.
- Workers and ES&H professionals have often defaulted to the MSDS rather than prescribing the appropriate hazard controls.

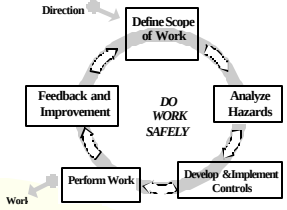


Perform Work Safety



Perform Work Within Controls

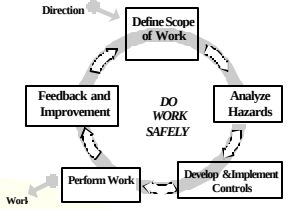
" Readiness is confirmed, and work is performed safely."



Perform Work Within Controls

Strengths …

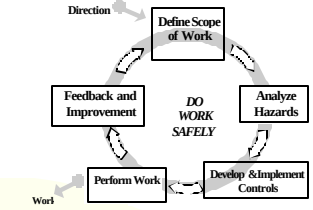
- In most cases, work involving chemicals was performed safety and within established controls.
- Overall, injury and illness rates with respect to chemicals are low and have been declining across the complex.
- Most sites have effectively used pre-job briefings to inform workers of chemical hazards.



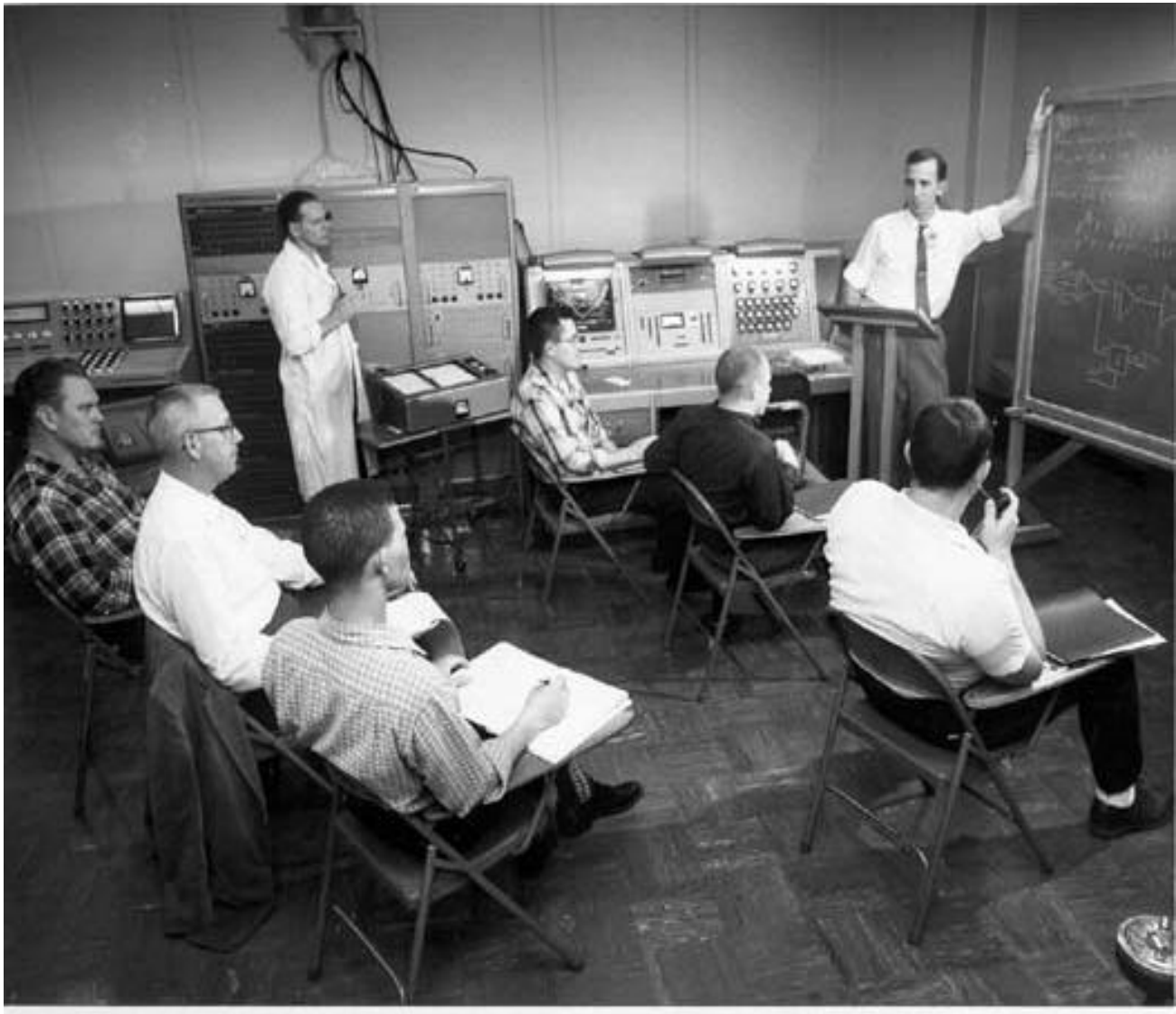
Perform Work Within Controls

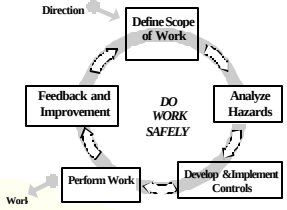
Opportunities for Improvement …

- A number of cases were observed where workers failed to follow procedures or instructions in work packages and hazard analyses involving chemicals.
- In some cases workers failed to conduct work within the prescribed controls (PPE and chemical signage)
- Supervisors fail to verify that the appropriate chemical training has been completed, or is current, prior to performing work. In some cases (e.g. construction), supervisors do not have a user-friendly mechanism to verify training records, particularly when multiple subcontractors are involved)



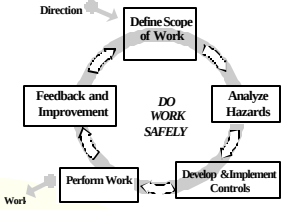
Feedback & Improvement





Feedback & Improvement

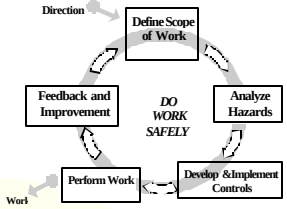
" Feedback information on the adequacy of controls is gathered, opportunities for improving the definition and planning of work are identified and implemented, line and independent oversight is conducted, and , if necessary, regulatory enforcement actions occur."



Feedback & Improvement

Strengths …

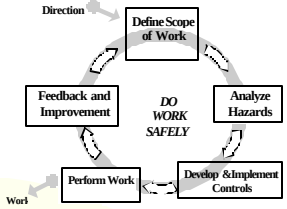
- Feedback and improvement processes (management assessments, self-assessments, etc.) have resulted in a number of enhancements to chemical management and use systems across the complex.
- There has been an increased focus on continued improvement in chemical management systems.
- In a number of cases, lessons-learned programs have been effective in communicating concerns identified with chemical management and chemical usage.



Feedback & Improvement

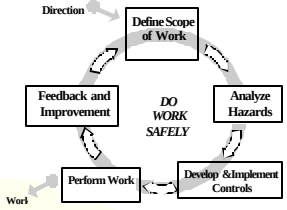
Opportunities for Improvement ….

- At many sites contractor self-assessments were not implemented at the prescribed frequency, and when conducted often lacked the depth a rigor necessary to ensure the adequacy of processes or level of performance.
- Activity level feedback on chemical use was often informal and not documented.
- Chemical deficiencies are often not captured in corrective action tracking systems. Corrective actions are often not risk ranked.



Overall Conclusions

- DOE sites have well established and documented programs to identify and control work activity level hazards associated with the use and storage of chemicals.
- Chemical usage and storage programs at DOE sites are generally in compliance with established requirements and industry standards (OSHA, DOE, ACGIH)
- Some sites have developed innovative programs for the identification and analysis of chemical hazards at the work activity level.
- Integrated safety management has enhanced the ability to identify, analyze and control chemical hazards at the work activity level.
- All sites could improve current chemical management practices and processes particularly in those areas identified in the previous slides.



Additional References

Focused Safety Management Evaluation Reports at the OA- web site

http://www.oa.doe.gov